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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/706,071	11/03/2000	Leif Wilhelmsson	34650-00605USPT	6691

7590 04/09/2004

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EXAMINER	
SCHEIBEL, ROBERT C	

ART UNIT	PAPER NUMBER
2666	

DATE MAILED: 04/09/2004

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/706,071	Applicant(s) WILHELMSSON ET AL.	
	Examiner Robert C. Scheibel	Art Unit 2666	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *03 November 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-40* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 November 2000* is/are: a)☐ accepted or b)☒ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4, 5, 6*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description: element 50 (line 16 of page 28) and 60 (line 5 of page 30). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

2. Applicant is required to submit a proposed drawing correction in reply to this Office action. However, formal correction of the noted defect may be deferred until after the examiner has considered the proposed drawing correction. Failure to timely submit the proposed drawing correction will result in the abandonment of the application.

Specification

3. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

4. The disclosure is objected to because of the following informalities: In the paragraph from line 4 of page 27 through line 10 of page 28, the figure numbers do not match the figure numbers in Figure 4. For example, in line 14 of page 27, the step of starting the back-of timer is indicated as step number 41, but is labeled 42 in the figure. Please review this paragraph and make corrections as appropriate.

Appropriate correction is required.

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (a) the invention was known or used by others in this country, or patented or described in a printed publication in this or a foreign country, before the invention thereof by the applicant for a patent.

6. Claims **1-2, 11-13, 21-22, and 31-33** are rejected under 35 U.S.C. 102(e) as being anticipated by the Bluetooth Core Specification Version 1.0 B (hereinafter referred to as "Bluetooth 1.0 B").

Regarding claims **1 and 21**, Bluetooth 1.0 B discloses all the limitations of these claims in section 3.19 on page 217. In the title of this section ("Channel Quality-Driven Change Between DM and DH") and in lines 1-3, the document clearly indicates that the change between DM and DH is to be driven based on the channel quality. Thus it is inherent that the devices are able to ascertain the channel quality. This anticipates the step of and channel quality processor for determining a quality measure for a channel of said network connection; a channel quality cannot be determined without a quality measure. The channel quality processor of claim 21 for performing this step of determining is anticipated by the processor that implements the link controller (LC) (see lines 7-8 of page 217 "Based upon quality measures in LC"). Further, the step of and channel condition processor for estimating a quality condition are anticipated by the channel quality discussed in this section. The link controller is also the channel quality processor. The step of and packet type selector for selecting a packet type are

anticipated by the change between DM and DH packets as discussed in this section. The packet type selector is the link manager (LM).

Regarding claims **2 and 22**, the limitation of the quality measure being determined from a receiver side is indicated in Sequence 45 and Sequence 46 on page 217. The receiver (the right-hand device) sends an LMP_preferred_rate message to the transmitter (the left-hand device) when the quality measure indicates that a change of packet type is required.

Regarding claims **11 and 31**, the limitation of the selected packet type being different from a previously selected packet type is anticipated by the change between DM and DH packet types (see the title of section 3.19 and the description in the main paragraph of page 217) which are clearly different.

Regarding claims **12 and 32**, the limitation of the network being an ad hoc network is anticipated by the fact that this document defined the Bluetooth standard which is defined for use in ad hoc networks as is well known in the art.

Regarding claims **13 and 23**, the limitation that the network is a Bluetooth wireless network is anticipated by the title of the document.

7. Claims **1-3, 8-9, 10-11, 14, 16-17, 21-23, 28-29, 30-31, 34, and 36-37** are rejected under 35 U.S.C. 102(b) as being anticipated by the paper "Improving Wireless LAN Performance via Adaptive Local Error Control" by Eckhardt et al.

Regarding claims **1 and 21**, Eckhardt discloses the step of determining a quality measure in the quality measures of truncation detection and decoder failure discussed

in the FLEX policy description paragraph found in section 6.3 on page 335. The channel quality processor is the 80486 processor described in the third line of section 7.1 on page 335. The step of estimating a quality condition is disclosed in the windowing scheme used on the truncation measure described in the FLEX policy description paragraph found in section 6.3 on page 335 ("Whenever two or more poll-response transactions in a window of ten experience truncation, FLEX reduces its estimate of the current safe packet size to 85% of the post-truncation packet length.") The quality condition is the number of transactions in a window of ten that experience truncation. As before, the channel condition processor is the 80486 processor described in the third line of section 7.1 on page 335. The step of selecting a packet type is disclosed in the third paragraph of section 6.2 on page 334. The different segment sizes and levels of FEC are the different packet types. The packet type selector is the adaptation policy module described in this section.

Regarding claims **2 and 22**, the limitation that at least one quality measure is determined based on information obtained from the receiver is disclosed in the third paragraph of section 6.2 on page 334. The information from the receiver is the "error reports that slaves include in DATA-ACK packets".

Regarding claims **3 and 23**, the limitation that at least one quality measure is determined based on information obtained in the transmitter unit is also disclosed in the third paragraph of section 6.2 on page 334. The information from the transmitter is the masters "own observations".

Regarding claims **8 and 28**, Eckhardt discloses the limitation of selecting a relatively short packet type when the channel has a high bit error rate in both the BIMODAL and BI-SIZE adaptation policies in paragraphs 5 and 6 of section 6.3 on page 335. When packet corruption is detected, these policies reduce the size of the packets.

Regarding claims **9 and 29**, Eckhardt discloses the limitation of selecting a relatively long, uncoded packet type if the channel is neither interference nor noise limited in the description of the BIMODAL adaptation policy. Eckhardt states that this policy behaves exactly like the BOLD policy when conditions are good; the BOLD policy uses maximally sized packets with no error coding.

Regarding claims **10 and 30**, Eckhardt discloses the conditions for when the packet type is changed in section 6.3. For example, in the description of the FLEX adaptation policy, Eckhardt states that "whenever two or more poll-response transactions in a window of ten experience truncation, FLEX reduces its estimate of the current safe packet size". There are other such similar descriptions. It is implicit that when the specified conditions are not met, the packet type remains the same as the previously selected packet type (packet size and encoding characteristics). Thus, Eckhardt discloses implicitly the limitation of claims 10 and 30 that the selected packet type is the same as a previously selected packet type.

Regarding claims **11 and 31**, Eckhardt discloses the limitation of the selected packet type being different than the previously selected packet type in the paragraph describing the FLEX policy of section 6.3 on page 335. A different packet size and/or a different degree of coding constitute different packet types.

Regarding claims **14 and 34**, Eckhardt discloses the limitation of the estimating step including comparing the quality measure to a predefined value in the window method described in the paragraph on the FLEX adaptation policy (section 6.3 on page 335). The predefined value in this case is two. If more than two transactions in a window of ten experience truncation (or decoder failure), a particular action is taken.

Regarding claims **16 and 36**, Eckhardt discloses the limitation of at least an error detection quality measure being used to estimate the channel condition in the detection of truncations described in section 6.3 on page 335. As described on line 2 of section 3.2 on page 329, truncation is the partial loss of a packet, so detection of packet truncation is clearly an error detection quality measure.

Regarding claims **17 and 37**, Eckhardt discloses the limitation of at least an FEC quality measure being used in the decoder failures described in the description of the FLEX adaptation policy in section 6.3 of page 335.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

9. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein

were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

10. Claims **4-5, 15, 24-25, and 35** are rejected under 35 U.S.C. 103(a) as being unpatentable over the paper "Improving Wireless LAN Performance via Adaptive Local Error Control" by Eckhardt et al.

Eckhardt discloses the limitations of the parent claims 1, 3, 21, and 23 (as appropriate) in the rejection according to 35 U.S.C. 102(b) above. Eckhardt does not explicitly suggest the limitation of ignoring receiver side measures of claims 4 and 24, the limitation of which quality measure is determined of claims 5 and 25, the limitation of the selected packet type being the same as a previously selected packet type of claims 10 and 30, the limitation of waiting a predefined time period before selecting a packet type of claims 15 and 35.

Regarding claims **4 and 24**, it would have been obvious to one of ordinary skill in the art to ignore receiver side quality measures. In the third paragraph of section 6.2 on page 334, Eckhardt indicates how the transmitter (master) utilizes both transmitter information (its own observations) and receiver information (error reports) in the adaptation policy module to track the quality of the wireless link. As is obvious to one of ordinary skill in the art, there can be discrepancies between these two independent pieces of information. In this case, it is obvious that a simple method of resolving these

differences is by using only one of the two measures when this situation is encountered. The motivation for doing so would have been to provide a simple method of resolving discrepancies between the two independent pieces of information. Therefore, it would have been obvious to modify Eckhardt to ignore receiver information for the benefit of a simple method of resolving discrepancies to obtain the invention as specified in claims 4 and 24.

Regarding claims **5 and 25**, although Eckhardt doesn't explicitly suggest the limitation of which one of the at least one quality measures depending on a previously selected packet type. However, Eckhardt uses decoder failures as one quality measure (as shown in the description of the FLEX adaptation policy in section 6.3 on page 335). Eckhardt also indicates that based on the channel quality, the transmitter may change the encoding such that the entire block carries user data; in other words, the data is unencoded. It is obvious to one of ordinary skill in the art that this measure (of decoder failure) cannot be used when the signal is not encoded. Thus, although Eckhardt doesn't explicitly suggest determining which quality measure based on the previously selected packet, it is obvious that this must be done to support the unencoded packet type described above. It would be obvious to one of ordinary skill in the art to modify Eckhardt to use either truncation and encoder failure measures or only truncation as quality measures based on the previously selected packet type. That is, only truncation is used when the unencoded packet type is selected and both measures are used when other packet types are selected. The motivation for doing so is to support unencoded packet types. Therefore, it would have been obvious to modify Eckhardt as described

above for the purpose of supporting unencoded packet types to obtain the invention as specified in claims 5 and 25.

Regarding claims **15 and 35**, it is well known to one of ordinary skill in the art to use a timer to implement a hysteresis mechanism when automatically varying a particular characteristic in a communications system. It would have been obvious to one of ordinary skill in the art to use a timer to control the frequency at which the packet type is changed. The motivation for doing so would have been to prevent the packet type from rapidly changing back and forth between multiple types when the channel quality measure is near a threshold. Therefore, it would have been obvious to add hysteresis using a timer to the invention of Eckhardt for the purpose of preventing the packet type from rapidly changing to obtain the invention as specified in claims **15 and 35**.

11. Claims **6-7 and 26-27** are rejected under 35 U.S.C. 103(a) as being unpatentable over the paper "Improving Wireless LAN Performance via Adaptive Local Error Control" by Eckhardt et al in view of U.S. Patent 5,920,597 to Khayrallah et al.

Eckhardt discloses all the limitations of the parent claims 1 and 21 as described in the rejection under 35 U.S.C. 102(b) above.

Eckhardt does not disclose expressly the limitations of using an uncoded packet type when the channel is primarily interference limited (claims 6 and 26) or using a coded packet type when the channel is primarily noise limited (claims 7 and 27).

Khayrallah teaches using higher coding rates when a channel is noise limited rather than interference limited in lines 57-61 of column 3. Khayrallah also implicitly teaches the converse of this – that lower coding rates are to be used when a channel is more interference limited that noise limited. Regarding claims **6 and 26**, the passage cited above discloses the limitation of using uncoded packet types when the channel is interference limited. Regarding claims **7 and 27**, the passage cited above also discloses the limitation of using coded packet types when the channel is noise limited.

Eckhardt and Khayrallah are analogous art because they are from the same field of endeavor of wireless communications systems.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify Eckhardt to use uncoded packet types when the channel is interference limited (larger number of truncations relative to the decoder failures detected) and use coded packet types when the channel is primarily noise limited (relatively small number of truncations relative to the decoder failures detected.)

The motivation for doing so would have been to improve the efficiency with which the bandwidth is used. This is implied by Khayrallah in lines 55-64 of column 3; the statement that more error correction is justified in primarily noise-limited channels implies that the error correction is more effective in these channel conditions. Conversely, this implies that error correction is less effective in interference-limited channels. Thus, this suggestion would improve the utilization of the channel (only using bandwidth for coding overhead when it is most effective.)

Therefore, it would have been obvious to combine Khayrallah with Eckhardt for the benefit of improved utilization of the channel to obtain the invention as specified in claims 6-7 and 26-27.

12. Claims **18-20 and 38-40** are rejected under 35 U.S.C. 103(a) as being unpatentable over the paper "Improving Wireless LAN Performance via Adaptive Local Error Control" by Eckhardt et al in view of U.S. Patent 5,701,294 to Ward et al.

Eckhardt discloses all the limitations of the parent claims 1 and 21 as described in the rejection according to 35 U.S.C. 102(b) above.

Eckhardt does not disclose expressly the limitation of claims 18 and 38 of at least a received signal strength and error detection quality measure are used. Further, Eckhardt does not disclose expressly the limitations of at least a packets positively acknowledged and power amplifier voltage are used to estimate the channel condition (claims 19 and 39) or the limitation of these measure being based partly on at least one of error detection, FEC, or signal strength quality measure (claims 20 and 40).

Regarding claims **18 and 38**, Ward discloses estimating the channel quality based on signal strength (SS) and error detection (BER) in lines 49-54 of column 8.

Regarding claims **19 and 39**, Ward discloses the limitation of estimating the channel quality based on a positive packets acknowledged in the BER from lines 49-54 of column 8. It is well known in the art that one means for estimating the bit error rate of a channel is based on the acknowledgements received in a typical ARQ error detection scheme. The limitation of the channel condition being estimated based on the power

amplifier voltage is disclosed in lines 8-28 of column 5 of Ward. The last two sentences indicate that if the signal strength is less than a threshold when the system is operating at maximum power, the call will be handed off or dropped. This clearly indicates that the power of the transmitter is used in the determination of the channel condition (since, as is well known, the channel condition is used to determine when to handoff or drop calls).

Regarding claims **20 and 40**, the limitation that the positively acknowledged packets quality measure and the power amplifier voltage are based partly on at least one of the error detection quality measure, FEC quality measure, and RSSI quality measure is disclosed in lines 8-28 of column 5. This passage links the transmitter power level and the signal strength in the determination of the channel condition. If the signal strength is less than a threshold, the power level is then evaluated to make a determination on the condition of the channel.

Eckhardt and Ward are analogous art because they are from same field of endeavor of detecting channel quality in wireless systems.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify Eckhardt to use signal strength, bit error rate, and transmitter power level to ascertain the channel quality.

The motivation for doing so would have been to more accurately measure channel quality by using more of the potential network conditions that may affect quality (as suggested in lines 24-29 of column 8).

Therefore, it would have been obvious to combine Ward with Eckhardt for the benefit of more accurate channel quality estimates to obtain the invention as specified in claims 18 and 19.

Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

U.S. Patent Application Publication 2003/0139136 to Pattabiraman discloses an invention very similar to that claimed by the applicant.

U.S. Patent 6,262,994 to Dirschedl et al, U.S. Patent Application Publication 2002/0036992 to Balachandran et al, U.S. Patent 6,163,577 to Ekudden et al, and U.S. Patent 6,567,375 to Balachandran et al all teach methods for changing the packet type, as defined by the present applicant, based on the channel quality.

U.S. Patent Application Publication 2001/0040880 to Chen et al, U.S. Patent 5,465,398 to Flammer, and U.S. Patent 6,519,236 to Haartsen et al teach methods for adjusting the transmission power based on the channel quality.

U.S. Patent 6,539,205 to Wan et al teaches a mechanism for estimating channel quality.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Robert C. Scheibel whose telephone number is 703-305-9062. The examiner can normally be reached on 6:30-3:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Seema S. Rao can be reached on 703-308-5463. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

RCS 3-27-04

Robert C. Scheibel
Examiner
Art Unit 2666

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